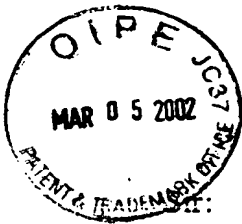


IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Application of Vandepopuliere et al.  
Serial No. 08/769,579  
Filed: 19 December 1996  
For: METHOD OF CONTROLLING  
SALMONELLA IN SHELL EGGS

COPY OF PAPERS  
ORIGINALLY FILED

Assistant Commissioner for Patents  
Washington, DC 20231



DECLARATION OF DR. JOSEPH M. VANDEPOPULIERE  
UNDER 37 CFR § 1.131

I, Joseph M. Vandepopuliere, Ph.D., hereby declare and say as follows:

1. I am an inventor on the above-captioned patent application, and I am presently a Professor of Animal Science at the University of Missouri-Columbia. I held this position during the time that the work described in the 08/769,579 application ("the '579" application) was carried out.
2. Prior to 22 November 1993, the filing date of United States Patent No. 5,589,211 to Cox et al., the work described in the '579 application had been completed. The laboratory data used to generate the tables and figures presented in the Example section of the '579 application are attached hereto at Tabs 1-12, and are described in detail below. All of the work relating to the invention described in the '579 application was carried out in this country. As discussed below, this work resulted in the production of a shell egg that was thermally treated to reduce *Salmonella* in the egg.
3. The laboratory notebooks relevant to the invention described in the '579 application were kept by myself, Mr. Jesse Lyons, and Dr. Aminul Haque. Mr. Lyons is a technician working in my laboratory and Dr Haque was a graduate student at the time these experiments were performed. Both Mr. Lyons and Dr. Haque worked under my

albumen/yolk interface or into the yolk of the egg. The shell eggs were then placed in water baths and heated as follows: at 56 °C for 45 minutes; at 56.75 °C for 32 minutes; and at 57.5 °C for 31 minutes. Some eggs were also heated at the same temperatures for shorter time periods, but only the most severe thermal treatments were used to generate Table 2 of the '579 application.

The temperature probe was connected to a computer, which captured and stored the data. The probe collected temperature readings from the interior of the egg at 5 second intervals. Copies of the computer data are attached hereto at Tabs 3-8 as follows: Tab 3 - 56 °C for 45 min.-albumen; Tab 4 - 56 °C for 45 min.-yolk; Tab 5 - 56.75 °C for 32 min.-albumen; Tab 6 - 56.75 °C for 32 min.-yolk; Tab 7 - 57.5 °C for 31 min.-albumen; and Tab 8 - 57.5 °C for 31 min.-yolk.

7. The thermal heating data were graphed as shown at Tab 9. Each graph is designated by the following code: the first set of numbers indicates the temperature at which the egg was heated, and the next set of numbers indicates the time in minutes. The "A" or "Y" appended to the numbers indicates whether the temperatures were obtained from the albumen or yolk, respectively. Thus, the first graph marked "56045A" was taken from an egg treated at 56 °C for 45 minutes, and the probe was placed in the albumen. The x-axis of each graph indicates the number of readings taken. Each reading was taken at 5-second intervals, thus, the time elapsed can be easily calculated (*i.e.*, 120 readings = 10 minutes, 240 readings = 20 minutes, *etc.*). The y-axis indicates temperature in °C. The representative thermal curve in Figure 2 of the '579 application is taken from the data presented at Tab 9.

8. The thermal curve data shown at Tabs 3-8 were analyzed to yield equivalent time and equivalent temperature points for intact shell eggs as described on pages 15-17 of the '579 application and in Swartzel, (1996) *J. Agric. Food Chem.*, 34, 397. These are the thermal point data presented in Table 2 of the '579 application. The equivalent point analyses were carried out at North Carolina State University and the results provided to us

by Dr. Hershell Ball prior to 22 November 1993. As stated above in ¶ 5, Dr. Ball was investigating our work on behalf of Michael Foods, the licensee of the '579 application.

9. Copies of the laboratory notebook pages on which the quality and functional data used to generate Table 3 of the '579 application were recorded are attached hereto at Tabs 10-12. These experiments were carried out prior to 22 November 1993. Experimental data evaluating the quality and functionality of thermal-treated shell eggs are presented at Tab 10. The experimental protocol was as follows: eggs were heated at the indicated times and temperatures (*i.e.*, no heat; 56.75 °C for 36 minutes; and 57.5 °C for 23 minutes) with and without oiling. The eggs were then stored for 0, 1, 2 or 4 weeks at 22.2 °C (indicated by "R" for room temperature in the laboratory notebook) or at 7.2 °C (indicated as "45 °" for 45 °F in the laboratory notebook). The data collected after 0, 1 and 2 weeks of storage are indicated at the top of the laboratory notebook pages. The data collected after 4 weeks of storage are indicated by the number "4" before the description of each of the treatments.

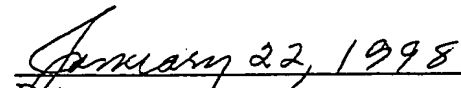
Whip volume (indicated by "foam volume" in the laboratory notebook), whip time, albumen height, drainage, opaqueness (determined by percentage transmission of incident light), and pH of the albumen were recorded for each control and treated egg. The data from each replicate were averaged and graphed as shown in Tab 11. The data concerning egg white pH, whip volume, and whip time for eggs stored for four weeks at 7.2 °C or 22.2 °C are presented in tabular form in Table 3 of the '579 application.

10. Haugh units were calculated for control and thermally treated shell eggs of ¶ 9. Data on egg weight and albumen height were recorded in the laboratory notebook pages at Tab 12. These numbers were then used to calculate Haugh units as shown in the computer printout at Tab 12. These data from eggs stored for 4 weeks at 7.2 °C or 22.2 °C are presented in Table 3 of the '579 application. These data were collected and the analysis carried out prior to 22 November 1993.

11. The data presented at Tabs 10-13 and in Table 3 of the '579 application indicate that intact shell eggs can be thermal-treated to eliminate *Salmonella* as described in the '579 application without a loss of egg quality or functionality.

12. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

  
Joseph M. Vandepopuliere, Ph.D.

  
Date